

UTC UNISONIC TECHNOLOGIES CO., LTD

10N40

Preliminary

10.5 Amps, 400 Volts **N-CHANNEL POWER MOSFET**

DESCRIPTION

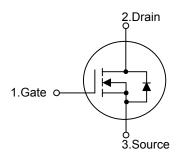
The UTC 10N40 is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC 10N40 is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

FEATURES

- * High switching speed
- * 10.5A, 400V, $R_{DS(ON)}$ =0.53 Ω @ V_{GS}=10V
- * 100% avalanche tested

SYMBOL

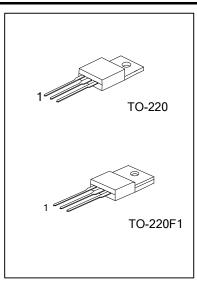


ORDERING INFORMATION

Ordering Number		Deekage	Pin	Deaking			
Lead Free	Halogen Free	Package	1	2	3	Packing	
10N40L-TA3-T	10N40G-TA3-T	TO-220	G	D	S	Tube	
10N40L-TF1-T	10N40G-TF1-T	TO-220F1	G	D	S	Tube	
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Note: Pin Assignment: G: Gate D: Drain S: Source

10N40L-TA3-T	(1) T: Tube
(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1
(3)Lead Free	(3) G: Halogen Free, L: Lead Free



Preliminary

■ **ABSOLUTE MAXIMUM RATINGS** (T_c=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	400	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous (T _c =25°C)	I _D	10.5	А
Drain Current	Pulsed (Note 1)	I _{DM}	42	А
Avalanche Current (Note 1)		I _{AR}	11	А
	Single Pulsed (Note 2)	E _{AS}	360	mJ
Avalanche Energy	Repetitive (Note 1	Note 1 E _{AR} 13.5 r	mJ	
Peak Diode Recovery	dv/dt (Note 3)	dv/dt	4.5	V/ns
Dower Dissinction	TO-220)	135	W
Power Dissipation		F1 P	44	W
Derate above 25°C		FD	1.07	W/°C
Derate above 25 C	TO-220	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	W/°C	
Junction Temperature	Temperature T _J +150		+150	°C
Storage Temperature Range		T _{STG}	-55~+150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT	
Junction to Ambient	TO-220	0	62.5	°C/W	
	TO-220F1	θ _{JA}	62.5		
lunction to Coop	TO-220	θ_{JC}	0.93	°C/W	
Junction to Case	TO-220F1		2.86		



■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V				V
Breakdown Voltage Temperature		∆BV _{DSS} /∆T _J	Reference to 25°C, I _D =250µA		0.54		V/°C
Coefficient							
Drain-Source Leakage Current		I _{DSS}	V _{DS} =400V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	- I _{GSS}	V_{GS} =+30V, V_{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS		1		1	1	1	
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250µA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =5.25A		0.43	0.53	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}			840	1090	pF
Output Capacitance		C _{oss}	/ _{GS} =0V, V _{DS} =25V, f=1.0MHz		250	325	pF
Reverse Transfer Capacitance		C _{RSS}			80	110	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G			28	35	nC
Gate to Source Charge		Q _{GS}	V _{GS} =10V, V _{DS} =320V, I _D =10.5A -(Note 4, 5)		4		nC
Gate to Drain Charge		Q_{GD}			15		nC
Turn-ON Delay Time		t _{D(ON)}			14	40	ns
Rise Time		t _R	V _{DD} =200V, I _D =10.5A, R _G =25Ω		89	190	ns
Turn-OFF Delay Time		t _{D(OFF)}	(Note 4, 5)		81	170	ns
Fall-Time					81	170	ns
SOURCE- DRAIN DIODE RATI	NGS AND	CHARACTERI	STICS				
Maximum Body-Diode Continuous Current		Is				10.5	Α
Maximum Body-Diode Pulsed Current		I _{SM}				42	Α
Drain-Source Diode Forward Voltage		V _{SD}	I _S =10.5A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{RR}	I _S =10.5A, V _{GS} =0V, dI _F /dt=100A/µs		290		ns
Body Diode Reverse Recovery (Q _{RR}	(Note 4)		2.4		μC
Notos: 1 Popotitivo Pating: Pul		•			•		

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. L = 5.7mH, I_{AS} = 10.5A, V_{DD} = 50V, R_G = 25 Ω , Starting T_J = 25°C

3. $I_{SD} \le 10.5$ A, di/dt ≤ 200 A/µs, $V_{DD} \le BV_{DSS}$, Starting T_J = 25°C

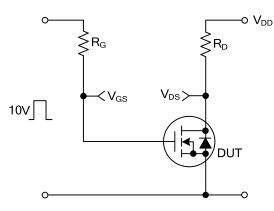
4. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%

5. Essentially independent of operating temperature

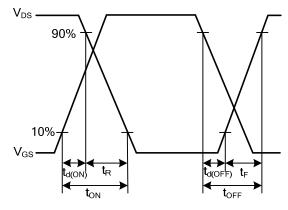


■ TEST CIRCUITS AND WAVEFORMS

Resistive Switching Test Circuit



Resistive Switching Waveforms



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